

# PATENT ABSTRACTS OF JAPAN

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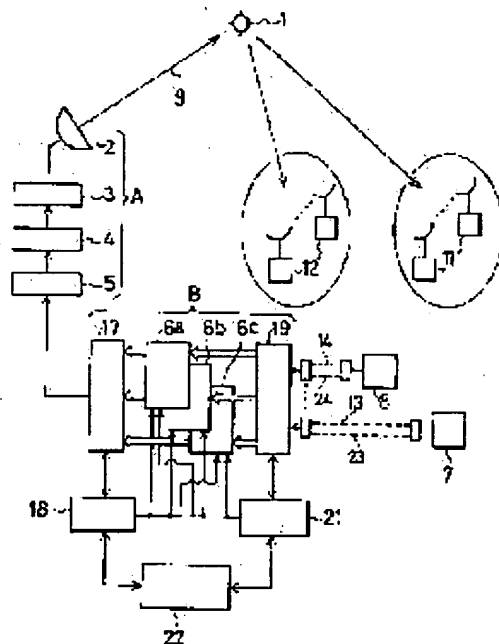
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## (54) DATA DISTRIBUTION TRANSFER SYSTEM

(57)Abstract:

PURPOSE: To improve the line using time rate and to reduce the cost of transfer per bit by distributing low-tension data while using an idle time zone of a communication line where high-tension data is not transferred. CONSTITUTION: Data to be sent from terminal equipments 7 and 8 are divided into emergency transmission data, non-emergency transmission S data, and non-emergency transmission L data, written in buffer memories 6a, 6b, and 6c respectively. In this case, the non-emergency transmission L data is the one with large latitude of the time from the collection to the transmission of data and capable of expecting periodical distribution through reservation. The emergency transmission data stored in the buffer memory 6a is preferentially read out and transmitted. The non-emergency transmission S data stored in the buffer memory 6b is read out and transmitted when the buffer memory 6a becomes empty. The non-emergency transmission L data stored in the buffer memory 6c is read out when the buffer memories 6a and 6b become empty.



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CLAIMS

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[Claim(s)]

[Claim 1] The satellite communication system characterized by providing or including the following In the satellite communication system by the data distribution type network which collects the Request-to-Send data from two or more users; and is transmitted to two or more receiving earth stations as a relay center using a transmitting earth station and a communication satellite The transmit data from two or more aforementioned users is buffer memory which stores these data in distinction from emergency and non-emergency as a transmitting processing means to classify into the data for urgent transmission, and the data for un-urgent transmission according to the demand from this user, and to process these data from two or more users. It is a means to take out the aforementioned data for urgent transmission preferentially according to arrival-of-the-mail sequence; to divide and take out the aforementioned data for un-urgent transmission when the buffer memory which stores the aforementioned data for urgent transmission is empty, and to add the sequence number of a user-identification signal, the destination, and data to the head of each data as a header unit, and to transmit to the aforementioned transmitting earth station.

[Claim 2] In the data distribution type transmission system which transmits the Request-to-Send data from two or more users to one or more destinations which each aforementioned user specifies In the aforementioned user side, they are the data for urgent transmission with the high urgency which transmits transmit data at the time of Request-to-Send generating, and the thing which transmits similarly at the time of Request-to-Send generating. S data for un-urgent transmission divided into two or more step story by the need according to the stage of a non-urgency, The permission width of face of time after collecting data until it transmits is large, and it classifies into L data for un-urgent transmission which distribute periodically by reservation. The aforementioned transmit data which added the identification code to each, transmitted to the data transmitting processing means, and was received with the aforementioned data transmitting processing means The aforementioned identification code is followed. The aforementioned data for urgent transmission, S data for un-urgent transmission, And it stores in the buffer memory which classifies into L data for un-urgent transmission, and corresponds, respectively. According to arrival-of-the-mail sequence, take out the aforementioned data for urgent transmission preferentially, and bundle up or divide and the aforementioned S data for un-urgent transmission are taken out, when the buffer memory which stores the aforementioned data for urgent transmission is empty. Bundle up or divide and the aforementioned L data for un-urgent transmission are taken out, when the buffer which stores the buffer memory which stores the aforementioned data for urgent transmission, and the aforementioned S data for un-urgent transmission becomes an opening simultaneously. The data distribution type transmission system characterized by distributing the transmission direction to the destination through the dedicated line restricted to \*\* on the other hand after adding the sequence number of a user-identification number, the destination, and data to the head of each data as a header unit.

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[Translation done.]

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DETAILED DESCRIPTION

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[Detailed Description of the Invention]

[0001]

[Industrial Application] This invention relates to the data distribution type transmission system which transmits the Request-to-Send data from two or more users to one or more destinations which each user specifies.

[0002]

[Description of the Prior Art] It is constituted as the data distribution type network which used the communication satellite as a relay center shows conventionally the satellite communication system which shares a transmitting earth station, a communication satellite, and a subcarrier to drawing 9. In drawing 9, A is a transmitting earth station which transmits data to a communication satellite 1, and contains the buffer memory 6 which takes clock adjustment with the antenna 2 connected one by one, a sending set 3, the transmit-frequencies inverter 4, a modulator 5 and a satellite circuit, and a land-based line.

[0003] The sending signal [ terminal unit / of the 1st user ] to which 7 was transmitted and the 2nd user's terminal unit and 9 were transmitted for 8 from the transmitting earth station A, the reception only office of the user of others / 11 / 12 / a user's reception only office and a Data Terminal Equipment, and ] and a Data Terminal Equipment, and 13 are switches with which the 1st user's land-based line and 14 patch the 2nd user's land-based line, and 20 patches the user-terminal equipment concerned and transmitting earth station equipment A in the time zone specified by a user.

[0004] Next, operation is explained. A terminal unit 7 sends the demanded data to the transmitting earth station A via a land-based line 13 according to the demand from a user. In the transmitting earth station A, the sent data are accumulated to buffer memory 6 via a switch 20, and it sends out to a communication satellite 1 as a sending signal 9 from an antenna 2 through a modulator 5, the transmit-frequencies inverter 4, and a sending set 3 after changing into the clock for satellite circuits.

[0005] The sent-out signal is broadcast again through a communication satellite 1 to the earth, and is received in all reception only offices. In the terminal unit of a reception only office, the address of \*\*\*\*\* is detected by the header unit of data which received, and received data are sent into a terminal unit. Since other reception only offices are not the headers of \*\*\*\*\* , do not incorporate received data and they are thrown away into a terminal unit. The same thing is performed also about the 2nd user.

[0006] In a series of above-mentioned operation, since the 1st user and the 2nd user send out data independently, the timing which sends out data laps and a collision may be caused at the entrance of the transmitting earth station A. In order to avoid this problem, it makes it possible to share the transmitting earth station A by two or more users by assigning a user's air-time band beforehand, assigning the set time zone with a switch 20, and inheriting a user's terminal units 7 and 8 and the transmitting earth station A.

[0007] Drawing 10 shows the time array of the sending signal 9 which transmits the data from two terminal units 7 and 8 from the transmitting earth station A using the above-mentioned satellite communication system, and the sending signal which transmits the data with which 71 and 72 are sent from a terminal unit 7, and 81 and 82 show the sending signal which transmits the data sent from a terminal unit 8.

[0008] Although the above explanation is about the case where multiple address distribution of data and the data of specific reception only office \*\* are uniquely sent out from terminal units 7 or 8, when performing the Request to Send of data from the reception only offices 11 or 12 to terminal units 7 or 8 via a land-based line, it performs same operation.

[0009] Moreover, although the above explanation is a satellite communication system in a data distribution type network and data were considered as the case of a reception only office by the piece delivery satellite circuit, even if a transceiver office is intermingled to this satellite communication system, essence of operation does not change.

[0010]

[Problem(s) to be Solved by the Invention] Since the conventional satellite communication system is constituted as mentioned above, in order to perform data transmission of two or more users In order to have to assign two time zones based on a demand of a user, As generally shown in drawing 10, idle time T was produced, it was difficult to raise the rate of the utilization time of a satellite circuit, and the repeater toll became comparatively high-priced, the competitive strength on cost with a land-based line was inferior, and there was a trouble of becoming trouble after that satellite communication spreads.

[0011] Invention according to claim 1 was made in order to cancel the above troubles, and it aims at obtaining the satellite communication system which can raise the rate of the utilization time of a satellite circuit as much as possible, sharing the communication satellite and carrier frequency which are used as a transmitting earth station facility and a relay center by two or more users.

[0012] Moreover, invention according to claim 2 overthrows the limitation of a communication line of being in charge of making it efficient, and aims at obtaining the data distribution type transmission system which can raise the rate of the utilization time of a communication line further.

[0013]

[Means for Solving the Problem] To the data from two or more users, the satellite communication system concerning invention according to claim 1 Give distinction of emergency and non-emergency at the time of demand generating, and the

buffer memory divided and stored in the data for urgent transmission and the data for un-urgent transmission as a data transmitting processing means is provided. According to arrival-of-the-mail sequence, take out the data for urgent transmission preferentially, and the data for un-urgent transmission are divided and taken out when the buffer memory which stored the aforementioned data for urgent transmission is empty. A data transmitting processing means to add the sequence number of a user-identification signal, the destination, and data to the head of each data as a header unit, and to transmit to a transmitting earth station is established.

[0014] Moreover, the data distribution type transmission system concerning invention according to claim 2 It is transmitted at the time of the data for urgent transmission with the high urgency which transmits transmit data at the time of Request-to-Send generating, and Request-to-Send generating. S data for un-urgent transmission divided into two or more step story by the need according to the stage of a non-urgency, And the permission width of face of time after collecting data until it transmits is large. And by reservation, classify into L data for un-urgent transmission which distribute periodically, and it stores in buffer memory. The data for urgent transmission are put in block or divided when the buffer memory in which S data for un-urgent transmission store the aforementioned data for urgent transmission preferentially according to arrival-of-the-mail sequence is empty. When the buffer memory which stores the buffer memory which stores the aforementioned data for urgent transmission, and S data for un-urgent transmission becomes an opening simultaneously, put in block or divide L data for un-urgent transmission, and they are taken out, respectively. After adding the sequence number of a user-identification signal, the destination, and data as a header unit, the transmission direction is distributed to the destination through the dedicated line restricted to \*\* on the other hand.

[0015]

[Function] By taking out the data for urgent transmission in order of arrival of the mail, taking out the data for un-urgent transmission, when the storing buffer memory of these data for urgent transmission is empty, and transmitting, the transmission efficiency of the data transmitting processing means in invention according to claim 1 of data improves, and it makes it possible to reduce transmission cost sharply.

[0016] Moreover, the data transmitting processing means in invention according to claim 2 Data for urgent transmission, S data for un-urgent transmission which were stored in buffer memory, The data for urgent transmission follow in order of arrival of the mail as the first priority among L data for un-urgent transmission. and S data for un-urgent transmission, and L data for un-urgent transmission When all the buffer memory to which the urgency is accumulating the data of a high order from it, respectively is openings, by bundling up, or dividing and transmitting, the data distribution type transmission system which raised the rate of the utilization time of a communication line further is realized together with on the other hand restricting the transmission direction of a dedicated line to \*\*.

[0017]

[Example] The example 1 of this invention is explained about drawing below example 1. Drawing 1 is the block diagram showing one example of invention according to claim 1, gives the same sign to the conventional satellite communication system shown in drawing 9, the same, or a considerable portion, and is omitting the explanation. In drawing 1, the buffer memory in which 6a stores the data for urgent transmission, and 6b are buffer memory which stores the data for un-urgent transmission. The data for urgent transmission will be data which expect being sent within the usual transfer time, and the data for un-urgent transmission will be reference data judged to be enough here, if it receives within the data for file transfers to send at the daytime, dozens of minutes, or several hours. Distinction of these emergency and non-emergency is given by the user before a user transmits these data.

[0018] Moreover, the buffer memory read-out interface section which carries out the interface of the read-out of the data with which 17 was stored in the above-mentioned buffer memory 6a and 6b, The read-out address control section which reads 18 to this buffer memory read-out interface section 17, and gives the address, The buffer memory write-in interface section to which 19 carries out the interface of the writing of the data to buffer memory 6a and 6b, 21 is a write-in address control section which writes in this buffer memory write-in interface section 19, and gives the address, and 22 is a processor for buffer memory which performs control of the read-out address control section 18 and the write-in address control section 21. B is a data transmitting processing means containing these buffer memory 6a and 6b, the buffer memory read-out interface section 17, the read-out address control section 18, the buffer memory write-in interface section 19, the write-in address control section 21, and the processor 22 for buffer memory.

[0019] In transmission of a satellite communication system, in order to fully use the frequency band of the communication satellite 1 which is a repeater, usually a signal with various bands or speed is multiplexed and sent here. There are Frequency Division Multiplexing (FDM) and Time Division Multiplexing (TDM) as the method of the multiplexing. Although the effectiveness of this invention does not change even if it uses the any, frequency multiplex and the case where a pulley assignment and a single channel per carrier (it is called Single Channel Per Carrier and Following SCPC) are used especially are shown here. SCPC is using one subcarrier for the signal transmission of one channel, and it multiplexes by things n \*\*\*\*\* at the interval which was able to determine the subcarrier which has the frequency bandwidth corresponding to the transmission speed of a sending signal as shown in drawing 2. In this case, one is a channel f1. It begins as a subcarrier is used, and a pulley assignment method assigns the frequency of a shell subcarrier. Since it became easier [ to fix frequency / a receiving station ] and cheap and the system configuration became easy when many receiving stations were used like the example of application of this invention in a data distribution type network, this method was made into the example. Drawing 1 has described the one channel, and when using the whole transmission-via-satellite machine, it should just carry out unit composition of drawing 1 to n piece parallel.

[0020] Next, operation is explained. The 1st user's terminal unit 7 sends the demanded data to the data transmitting processing means B via a land-based line 13. With the data transmitting processing means B, the data received in the buffer memory write-in interface section 19 are written in buffer memory 6a or 6b with the directions from this write-in address control section 21 at the same time it will give arrival-of-the-mail interruption directions to the write-in address control section 21, if the sent data are received in the buffer memory write-in interface section 19. in this case -- since the data sent out from the 1st user's terminal unit 7 are distinguished by the data for urgent transmission, and the data for un-urgent transmission, and are boiled, respectively and the identification code is attached -- urgent transmit data -- buffer memory 6a -- moreover, the data for un-urgent transmission are classified into buffer memory 6b according to control of the write-in

address control section 21 by directions of the processor 22 for buffer memory, and are written in it in order of arrival of the mail, respectively

[0021] The data for urgent transmission stored in buffer memory 6a are read via the buffer memory read-out interface section 17 by directions of the read-out address control section 18. Under the present circumstances, the user-identification signal generated by the processor 22 for buffer memory is added to the header unit of data. On the other hand, the data distinguished as un-urgent transmit data are written in buffer memory 6b by control of the write-in address control section 21 by directions of a processor 22 in order of arrival of the mail. When buffer memory 6a which stored the data for urgent transmission becomes empty, the stored data for un-urgent transmission are divided into the packet of suitable length by directions of the read-out address control section 18, and are read via the buffer memory read-out interface section 17. Under the present circumstances, the user-identification signal generated by the processor 22 for buffer memory like the case of the data for urgent transmission is added to the header unit of data. If the data for urgent transmission are written in buffer memory 6a at the midst which the data for un-urgent transmission are read and has been sent to the modulator 5, the processor 22 for buffer memory reads read-out stop directions of the data for un-urgent, and performs them to the address control section 18, and it directs to give priority to and read the data for urgent transmission written in at buffer memory 6a to the read-out address control section 18.

[0022] The data with which it was read from buffer memory 6a or 6b, and a user-identification signal and the destination were added to the header unit are sent out towards a communication satellite 1 as a sending signal 9 via a modulator 5, the transmit-frequencies inverter 4, a sending set 3, and an antenna 2. If a communication satellite 1 receives a sending signal 9, it will retransmit a message towards the earth and this signal will be received in all reception only offices. In a reception only office, the user-identification signal of the header unit of received data and the address of \*\*\*\*\* are detected, and it incorporates to a terminal unit. In other reception only offices, the data received unless the address signal of \*\*\*\*\* was detected are thrown away. Moreover, the office which received the data for un-urgent stores data in the memory of a terminal unit in order of arrival, and it receives data until all data gather. The operation same also in the 2nd user as the 1st user is performed. Furthermore, users may increase in number.

[0023] Drawing 3 is drawing showing the time array of a user's data sent as a sending signal 9. In drawing 3, a (b) shows the case of the conventional satellite communication system without distinction of the data / data for un-urgent transmission for urgent transmission, and produces idle time in the time array of a sending signal. A (b) is the example of the satellite communication system of this example 1 that inserts in and sends the data for un-urgent transmission there using the idle time of data sending out for urgent transmission, and it is shown that transmission with sufficient efficiency without \*\*\*\*\* idle time is possible. In addition, from the reception only offices 11 or 12, although this example 1 showed the case of multiple address distribution of the data uniquely sent from the user-terminal equipments 7 and 8, and data distribution of specific reception only office \*\*, when performing a data distribution demand to terminal units 7 or 8, for example via a land-based line, it is the same.

[0024] The example 2 of example 2., next this invention is explained. Drawing 4 is the block diagram showing one example of invention according to claim 2, gives the same sign to the same portion as drawing 1, and is avoiding duplication of explanation. In drawing 4, 6b and 6c are buffer memory which stores separately S data for un-urgent transmission and L data for un-urgent transmission which are explained later, respectively, and 23 and 24 are land-based lines which connect a user's terminal units 7 and 8 and the buffer memory write-in interface section 19, and are especially used for transmission of the aforementioned L data for un-urgent transmission.

[0025] Although data distribution of a still picture, various CAD data, a floppy disk, the data of a laser disc, etc., file transfers, etc. including facsimile treat all the data distributed to \*\* on the other hand from a certain part in the part of other hope in the distribution system in this example 2 here, the data is classified into three kinds according to this example by the urgency as follows.

[0026]

[Table 1]

データの種類	緊 急 度	最 大 データ量	ユーザから の入力	入 力 回 線
緊急送信用 データ①	大 (例・数分以内)	小	要求発生 ベース	送信データに応 じた速度の回線
非緊急送信用 Sデータ②	中 (例・数時間以内)	中	要求発生 ベース	同 上
非緊急送信用 Lデータ③	小 (例・半日 or 1 日中)	大	予約ベース	より高速な回線

[0027] It is the feature that it is data which it is a lot of data, such as file updating of CAD data, a highly minute still picture, and a computer, and the time from collection to transmission has permission width of face large in a sending station like half a day or one day in data, and especially L data for un-urgent transmission can expect that periodical distribution is by reservation. Since the amount of data is large, and the data of this reservation base are compared when it is the data for urgent transmission, and S data for un-urgent transmission and generally have a possibility that to be more high-speed as a communication line may be demanded, and it may close a circuit for a long time, it is necessary to input by another land-based lines 23 and 24 in that case. Moreover, as one method, it is also considered by the user side that data call data from a sending-station side at the \*\*\*\*\* time.

[0028] Next, operation is explained. The Request-to-Send data from a user are sent to the data transmitting processing means B via land-based lines 13 and 14, or 23 and 24 according to each protocol from terminal units 7 and 8. With the data transmitting processing means B, data are written in either of the buffer memory 6a, 6b, and 6c by the directions from this write-in address control section 21 at the same time they give arrival-of-the-mail interruption directions to the write-in address control section 21 via the buffer memory write-in interface section 19. In this case, since the data sent out from a user's terminal units 7 and 8 are distinguished by the data for urgent transmission, S data for un-urgent transmission, and L data for un-urgent transmission and the identification code is given to each. The data for urgent transmission S data for un-urgent transmission to buffer memory 6a to buffer memory 6b. Moreover, L data for un-urgent transmission are classified into buffer memory 6c according to control of the write-in address control section 21 by directions of the processor 22 for buffer memory, and are written in it in order of arrival of the mail, respectively.

[0029] The data for urgent transmission stored in buffer memory 6a are read via the buffer memory read-out interface section 17 by directions of the read-out address control section 18. Under the present circumstances, the user-identification signal and the destination which were generated by the processor 22 for buffer memory are added to the header unit of data. S data for un-urgent transmission stored in buffer memory 6b on the other hand are read via the buffer memory read-out interface section 17 by directions of the read-out address control section 18, when buffer memory 6a which stored the data for urgent transmission becomes empty. Under the present circumstances, the user-identification signal and the destination which were generated by the processor 22 for buffer memory like the case of the data for urgent transmission are added to the header unit of data. The processor 22 for buffer memory reads read-out stop directions of S data for un-urgent transmission, performs them to the address control section 18, if the data for urgent transmission are written in buffer memory 6a, as it gives priority to and reads the written-in data for urgent transmission, is read to the midst which S data for un-urgent transmission are read, and has been sent to the modulator 5, and it is directed to it at the address control section 18. When buffer memory 6a becomes empty again, it points to the start of read-out of S data for un-urgent transmission with the above-mentioned procedure, and the above-mentioned procedure is repeated until a series of S data for un-urgent transmission finish reading.

[0030] Moreover, L data for un-urgent transmission stored in buffer memory 6c are read via the buffer memory read-out interface 17 by directions of the read-out address control section 18, when buffer memory 6a which stored the data for urgent transmission, and buffer memory 6b which stored S data for un-urgent transmission become empty simultaneously. Under the present circumstances, the user-identification signal and the destination which were generated by the processor 22 for buffer memory are added to the header unit of data. If data are written in buffer memory 6a or 6b, the processor 22 for buffer memory will perform read-out stop directions of L data for un-urgent transmission to the read-out address control section 18, and will give priority to and read the written-in data to the midst which L data for un-urgent transmission are read, and has been sent to the modulator 5. When buffer memory 6a and 6b becomes empty simultaneously again, it points to the start of read-out of the data L for un-urgent transmission, and the above-mentioned procedure is repeated until a series of L data for un-urgent transmission finish reading.

[0031] The data with which it was read from buffer memory 6a, 6b, or 6c, and a user-identification signal and the destination were added to the header unit are sent out towards a communication satellite 1 through the satellite circuit which is a dedicated line as a sending signal 9 via a modulator 5, the transmit-frequencies inverter 4, a sending set 3, and an antenna 2. A communication satellite 1 is turned to the earth, and broadcasts an input signal again, and this signal is received in all reception only offices. In the corresponding reception only office, the user-identification number of received data and the destination of \*\*\*\*\* are detected, and data are incorporated. In other reception only offices, since the destination signal of \*\*\*\*\* is not detected, received data throw away. Moreover, the office which required S data for un-urgent transmission or L data for un-urgent transmission is considered as the completion of reception, when data are divided, data are stored in the memory of a reception only office in order of arrival and a series of data gather. The data incorporated to the reception only office are sent to the bottom of necessary interface conditions at a receiving-side terminal according to the protocol of a use terminal.

[0032] Drawing 5 is explanatory drawing shown as contrasted with the time distribution of Request-to-Send data supposing the time array of the data of the user sent into a satellite circuit, i.e., the busy condition of a circuit. When, as for the drawing 5 (b), a (b) distinguishes data \*\* for urgent transmission, and S data \*\* for un-urgent transmission only in data \*\* for urgent transmission, a (c) shows the case where L data \*\* for un-urgent transmission is added further. the parallel from n users limited as the case where the pulley assignment SCPC is used in this example 2 like the above-mentioned was shown and this showed drawing 6 -- and the data which were sent at random and accumulated at buffer memory -- circuit capacity (transmission speed) -- it means being sent out by the fixed output circuit

[0033] Here, when urgency is required by transmission of data, it is necessary to make capacity (transmission speed) of an output circuit larger than the capacity (transmission speed) of an input circuit corresponding to the peak of traffic. The number of users will be defined taking traffic into consideration according to the capacity (for example, 64 kb/sec) of an output circuit, since circuit capacity cannot be chosen arbitrarily in fact. The drawing 5 (b) showed "a time distribution of Request-to-Send data" and "the busy condition of a circuit" in such a state. If a user mainly assumes a time distribution of Request-to-Send data to be a company, like the usual communication service, concentration of traffic will be seen before or after the beginning of an afternoon, and closing time from 9:00 to 10:00, and the rest will be considered to be a pattern with average becoming a non-dense in the morning. Although the actual traffic distribution is more complicated, since it is easy, it has normalized by circuit capacity in this drawing. Since time lags are few at urgent transmission, the busy condition of a circuit is almost equal to a time distribution.

[0034] Next, the case where S data \*\* for un-urgent transmission which accepts some delay is added is shown in the drawing 5 (b). In this case, since the delay of transmission of S data for un-urgent transmission is allowed, S data \*\* for un-urgent transmission may exceed and input the capacity of an output circuit, and also compares the busy condition of a circuit like illustration at the time only of the data for urgent transmission, and transmission with sufficient time efficiency with little idle time is possible for it. However, as long as only the data transmitted at the time of Request-to-Send generating like data \*\* for urgent transmission or S data \*\* for un-urgent transmission were treated, when traffic concentration in a specific time zone is not avoided but output circuit capacity is doubled with this, the idle time in a middle time zone will still remain considerably like the drawing 5 (b). Moreover, if change of the traffic depended on transmission is expected, the rate of idle

time will serve as size further.

[0035] The drawing 5 (c) is the case where L data \*\* for un-urgent transmission which can expect periodical distribution by reservation as mentioned above is newly added in addition to above-mentioned data for urgent transmission \*\*, and S data \*\* for un-urgent transmission. This L data \*\* for un-urgent has much a lot of data, and since it also becomes closing a circuit with the circuit for data \*\* for urgent transmission, or S data \*\* for un-urgent transmission in this case for a long time, apart from data \*\* for urgent transmission, or S data \*\* for un-urgent transmission, it inputs into buffer memory using a separately more high-speed circuit. Moreover, as an option, it is also considered by the user side that data call data from a transmitting side at the \*\*\*\*\* time. Thus, it is the storing situation of \*\* of the drawing 5 (c) that data for urgent transmission \*\* and S data \*\* for un-urgent transmission showed the pattern of L data \*\* for un-urgent transmission incorporated separately. By newly adding this L data \*\* for un-urgent transmission, the idle time of a circuit is buried notably and can gather the rate of the utilization time of a circuit enough. It depends on the rate of change [ how far efficiency can be gathered ] of daily traffic. in addition -- although the urgency of data was made into the three-stage as most general thing in this example 2 -- a demand of a user -- the view is the same, even if it increases the stage of S data for un-urgent, in order to exclude the stage of S data for un-urgent by how and to meet the reverse more fine demand

[0036] Moreover, in this example 2, transmission by handshaking according to the protocol decided with an used terminal unit is performed between transmit-terminal <--> data transmitting processing meanses and between reception only office <--> accepting stations, and the dedicated line section by the satellite circuit between transmitting earth station -> reception only offices serves as data transmission by the 1 direction transmission. Thus, it is suitable for transmitting the data signal train sent out that there is almost no crevice as it is using the above-mentioned data transmitting processing means that a dedicated line is one directivity at the same time the efficiency of data transmission improves substantially as the procedure which performs the reset of a channel at every communication is unnecessary. In addition, when signals, such as the confirmation of receipt and a resending demand, need to be returned to a transmitting side from a receiving side by this method, a land-based line is used separately.

[0037] Furthermore, although the example of drawing 4 is the case of connection of the public line which has a receiving-side terminal unit within a reception only office or the same the enclosure, and a dedicated line, when an accepting station is in the place distant from the reception only office, naturally the meantime will be connected with a public line. Moreover, although drawing 4 explained the case where a satellite circuit was used as the dedicated line, even if it uses the ground dedicated line restricted to the 1 direction transmission, the operation completely same as a distribution system is carried out, and the same effect as the above-mentioned example is acquired.

[0038] The example 2 explained based on example 3. drawing 4 is the case where the pulley assignment SCPC is used in order to make cheap the price of the reception only office put on a user side as much as possible so that it may be widely used also for a petty user. For this reason, a limitation is in improvement in the rate of between average utilization times of the required shell which stuffs the traffic which has the change from many users in one circuit, and a circuit naturally. In order to gather further the rate of between average utilization times of this circuit, demand traffic increases rapidly, and when it is judged that data are sent and it does not go out to within a time [ regular ], by one circuit, it is necessary to prepare the 2nd circuit which sends out the data of the surplus.

[0039] Drawing 7 is the structure-of-a-system view of such an example, and the portion which that of most is the same as that of drawing 4, and overlaps does not repeat explanation. In drawing, 4a, 5a, and 4b and 5b are the power converters and modulators which make the subcarrier of different frequency, respectively, and 25 is a transmitting routing processor which carries out the monitor of the transmitting situation of the two transmitting roots, and performs transmitting routing. 9 and 10 are sending signals transmitted from the transmitting earth station A through a power converter, Modulators 4a and 5a, and 4b and 5b. Moreover, the subcarrier spectrum of the sending signals 9 and 10 which 41 passes through the bandwidth of a repeater (communication satellite 1), and 42 and 43 pass through power converters 4a and 4b and Modulators 5a and 5b, respectively, and are transmitted from the transmitting earth station A is shown [ in / drawing / drawing 8 is explanatory drawing showing the frequency spectrum of the repeater of a communication satellite 1, and ].

[0040] Next, operation is explained. Beforehand the data for urgent transmission, S data for un-urgent transmission, and L data for un-urgent transmission Although the data which were classified according to the urgency and sent to the data transmitting processing means via the land-based line from a user's terminal unit are once stored in either of the buffer memory 6a, 6b, and 6c and are sent to the transmitting earth station A by the regular procedure one by one after that according to the ranking of an urgency This procedure is as having already described based on the example 2 shown in drawing 4.

[0041] A user's demand traffic increases in part in this process. either of the amounts of data under accumulation to each buffer memory of 6a, 6b, and 6c When the constant rate defined individually was surpassed and it becomes impossible to deliver to within a time [ regular ], The processor 22 for buffer memory is vacant from the transmitting routing processor 25, directions of the root are received, and data are sent out to the root which minded the data of the buffer memory concerned, minded the buffer memory read-out interface section 17, and was specified each time. Sending out from another root is stopped by the stage whose amount of the accumulation data of the buffer memory concerned became less than the constant rate, and it returns to transmission only by the 1 original root. When the state where the \*\* amount of data in buffer memory exceeds a constant rate arises simultaneously in two or more buffer memory by traffic rapid increase, it transmits previously from the data in the buffer memory which has held the data which are an urgency, and which become size.

[0042] Although the constant rate which defines the start of 2 wave transmission here has how to decide various, it shows the easiest example below. It thinks from the urgency specified to be the buffer memory concerned, transmission speed of the circuit which sends out alpha time and data for the remaining time which transmission of accumulation data is allowed is made into 64 kb/s, and D, then the above-mentioned constant rate K become the following about the amount of data it is assumed to be to input into an alpha within a time in an urgency high order.

[0043]  $K = \alpha \times 3600 \times 64 \text{ kb-D}$  [0044] The signal returned towards the ground via the communication satellite 1 is received in all reception only offices. The reception only office included in this system has the function to receive two subcarriers simultaneously, the recognition signal of a header unit is supervised, discernment of \*\*\*\*\* is performed, only when \*\*\*\*\* data are detected, data are incorporated to a terminal unit, and the data which are not \*\*\*\*\* are thrown away. Thus, it



becomes possible by building a subcarrier in a 1 wave excess, preparing another root, and using it simultaneously 2 waves at the time of the need to raise the rate of between average utilization times of an original circuit till the place which permits overflow of the grade which is also traffic with change.

[0045] In addition, although old explanation showed the example of 2 wave transmission which added another subcarrier for reserves for traffic rapid increase to one regular subcarrier, when the grade of traffic overflow is not not much frequent, it is also possible to build one common reserve subcarrier to N regular subcarriers.

[0046]

[Effect of the Invention] As mentioned above, according to invention according to claim 1, it has the buffer memory which divides and stores data in the data for urgent transmission, and the data for un-urgent transmission. The data for urgent transmission are taken out, respectively, when the buffer memory in which the data for un-urgent transmission stored the data for urgent transmission preferentially according to arrival-of-the-mail sequence is empty. Since it constituted so that a data transmitting processing means to add a user-identification signal, the destination, and the header unit by the sequence number of data to the head, and to transmit to a transmitting earth station might be established The data which put on the subcarrier of a transmitting earth station can be efficiently multiplexed in the state with little idle time, and it becomes possible to reduce the transmission cost per bit sharply.

[0047] Moreover, data for urgent transmission and S data for un-urgent transmission which transmit transmit data at the time of Request-to-Send generating according to invention according to claim 2, And after collecting data, the permission width of face of the time to transmission is large, and it classifies into L data for un-urgent transmission in which periodical distribution is possible by reservation. Since it constituted so that the low data of an urgency might be transmitted using the idle time of a dedicated line when data more urgent than it are not transmitted and a dedicated line might be used only within the 1 direction transmission It becomes possible to cut down the idle time of a dedicated line further, the rate of between utilization times of a dedicated line improves sharply, and it is effective in the ability to reduce the transmission cost per bit further. Moreover, since the effect of this invention is not influenced by the property of the transmission line, it is clear. applicable to the data distribution system in which this invention has not only a satellite circuit but a land-based line and which was ]

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[Translation done.]



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## DESCRIPTION OF DRAWINGS

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[Brief Description of the Drawings]

[Drawing 1] It is the block diagram showing the example 1 of this invention.

[Drawing 2] It is explanatory drawing showing the frequency allocation in SCPC.

[Drawing 3] It is explanatory drawing showing time arrangement of the sending signal of the above-mentioned example.

[Drawing 4] It is the block diagram showing the example 2 of this invention.

[Drawing 5] It is explanatory drawing showing time arrangement of the sending signal of the above-mentioned example.

[Drawing 6] It is explanatory drawing showing typically the relation between the input circuit of buffer memory, and an output circuit.

[Drawing 7] It is the block diagram showing the example 3 of this invention.

[Drawing 8] It is explanatory drawing showing the frequency spectrum of the repeater in the above-mentioned example.

[Drawing 9] It is the block diagram showing the satellite communication system in the conventional data distribution type network.

[Drawing 10] It is the block diagram showing the satellite communication system in the distributed type network of the conventional system.

[Description of Notations]

1 Communication Satellite

6a Buffer memory

6b Buffer memory

6c Buffer memory

A Transmitting earth station

B Data transmitting processing means

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[Translation done.]

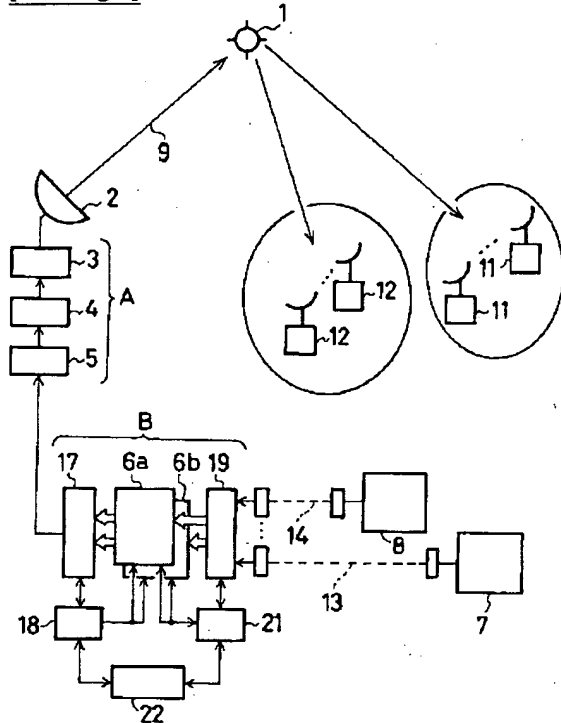
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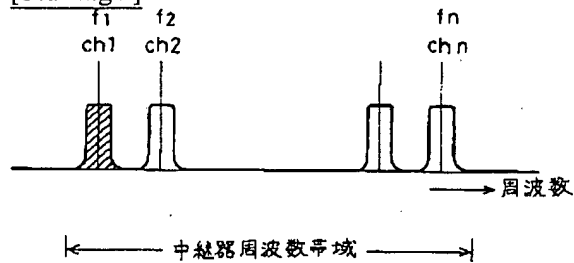
## DRAWINGS

[Drawing 1]

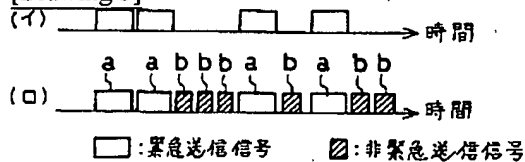


1: 通信衛星  
6a, 6b: バッファメモリ  
A: 送信地球局  
B: データ送信処理手段

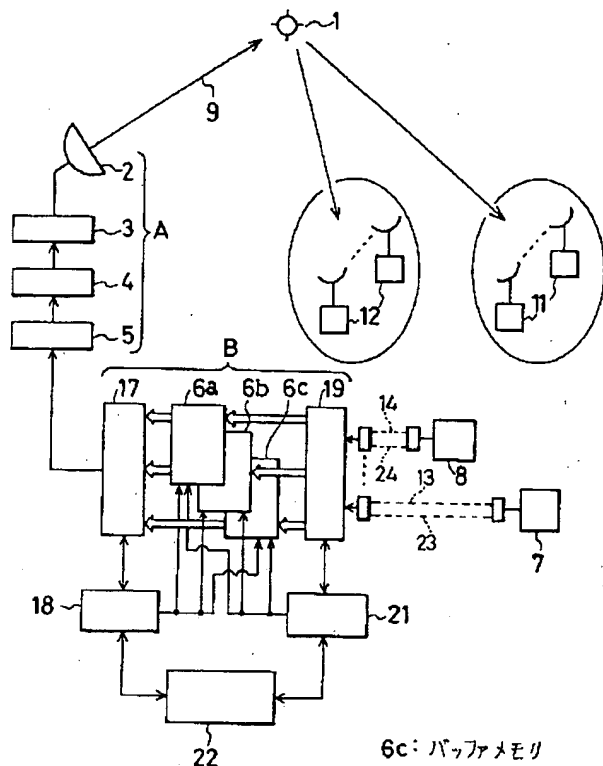
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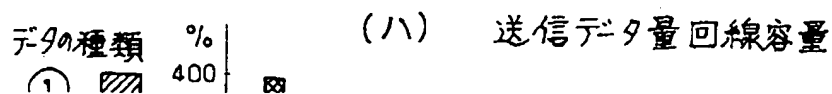
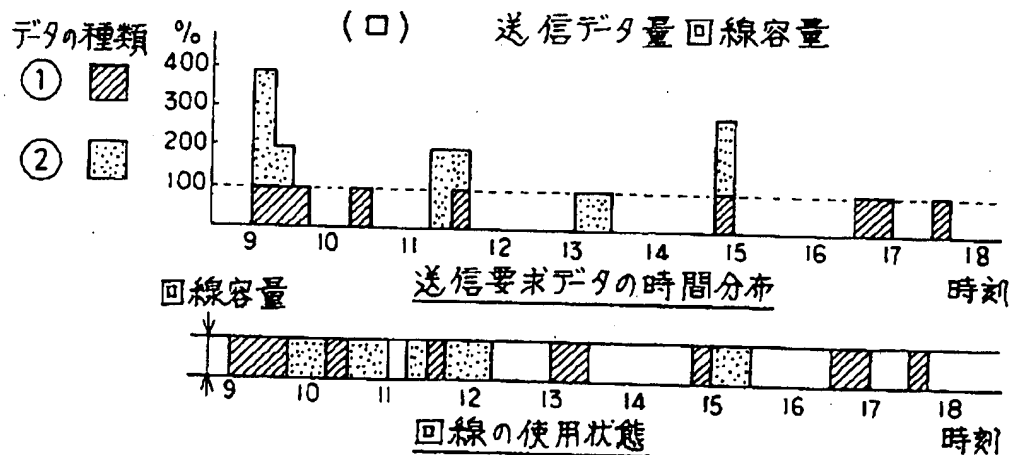
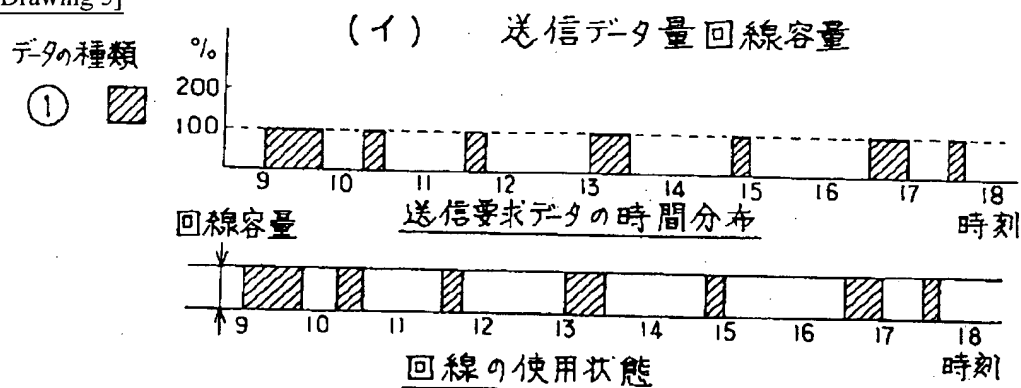
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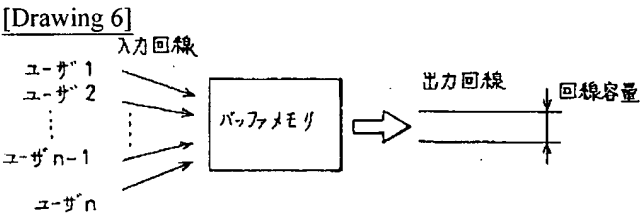
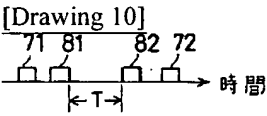
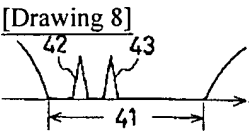


[Drawing 4]

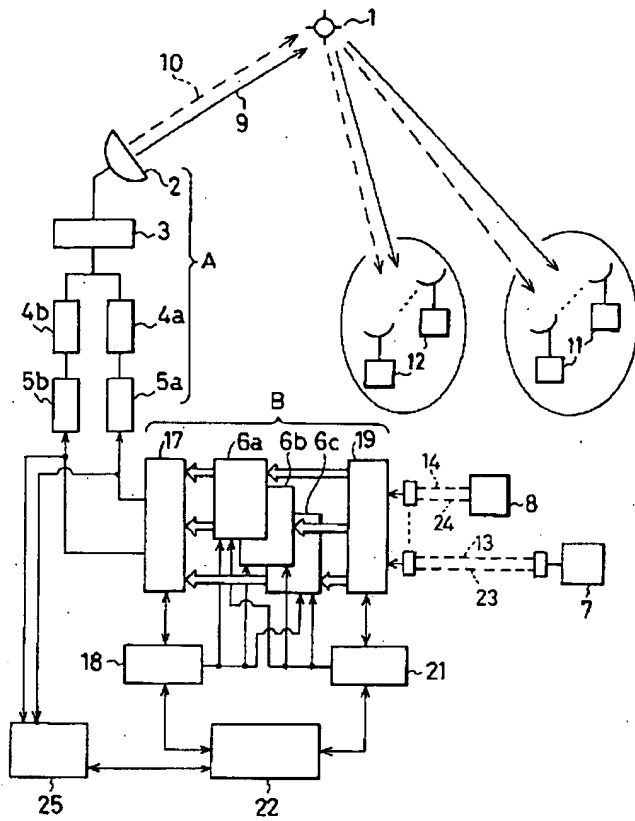


[Drawing 5]





[Drawing 7]



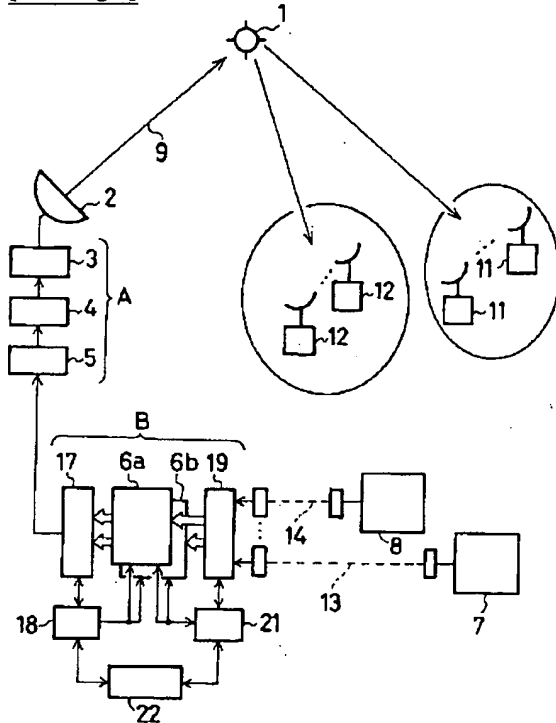
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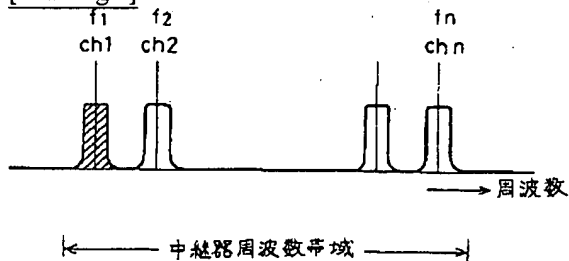
DRAWINGS

[Drawing 1]

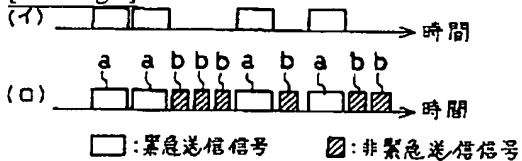


- 1: 通信衛星  
6a, 6b: バッファメモリ  
A: 送信地球局  
B: データ送信処理手段

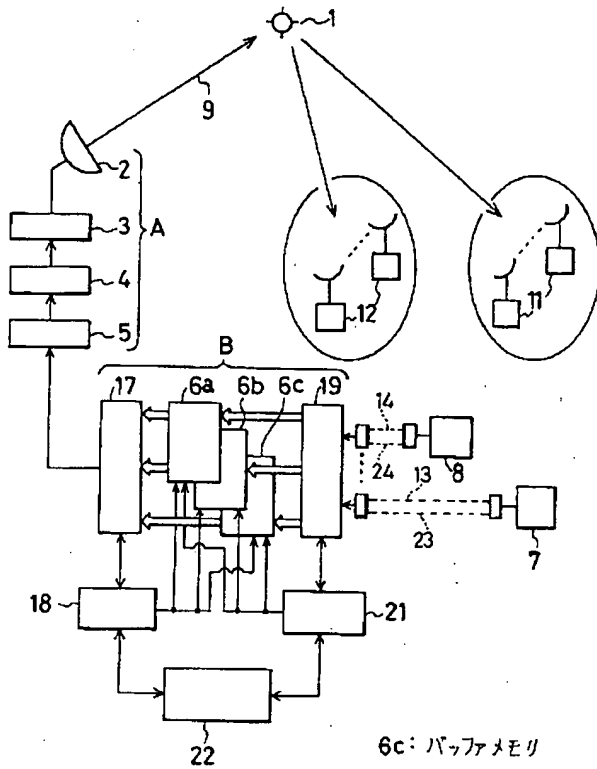
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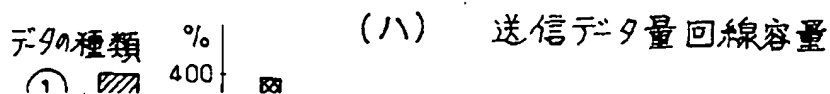
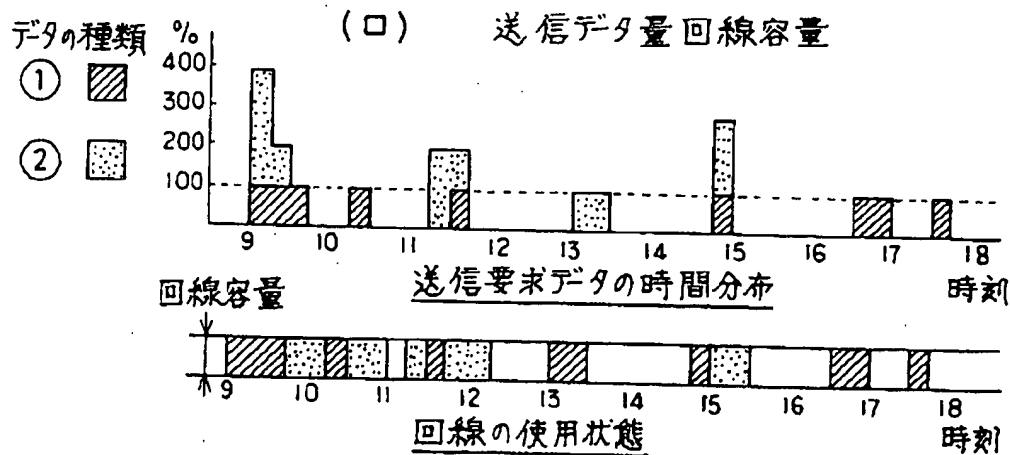
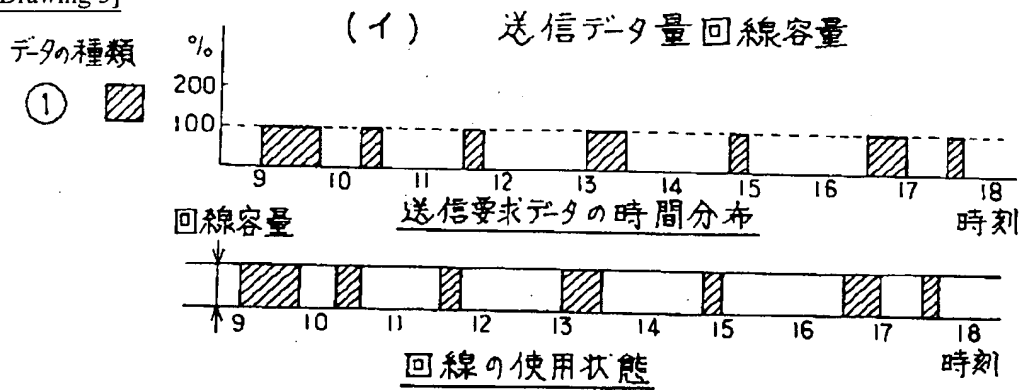
[Drawing 3]



[Drawing 4]

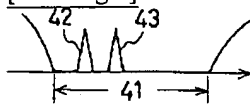


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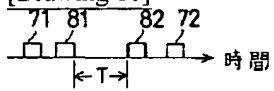




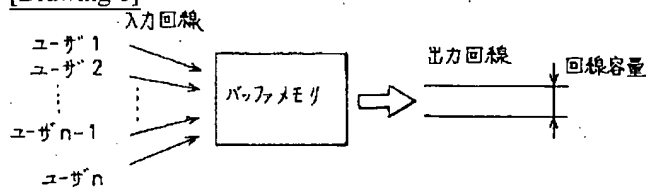
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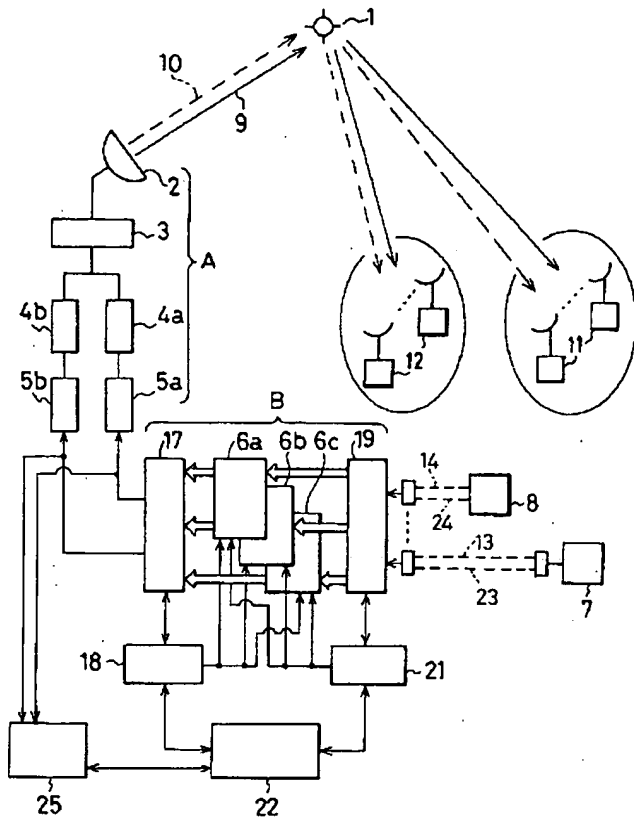
[Drawing 10]



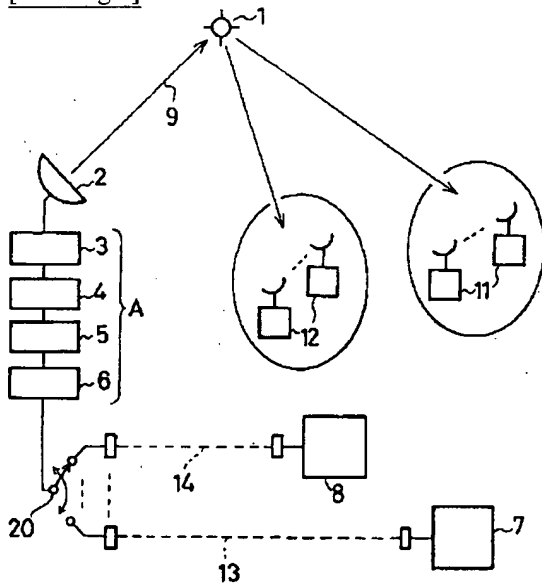
[Drawing 6]



[Drawing 7]



[Drawing 9]



[Translation done.]